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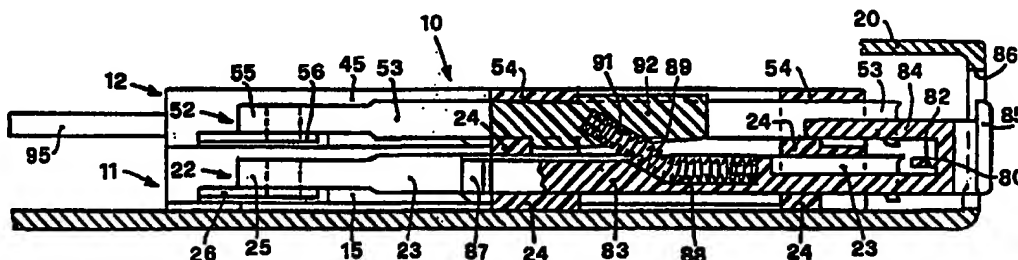
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(54) Title: READING UNIT OF MAGNETIC MEMORY CARDS WITH MANUAL CARD EXPULSION MECHANISM



## (57) Abstract

This invention concerns a reader (10) of magnetic memory cards known as "IC memory cards" or "PCMCIA" memory cards, comprising a first housing in which a card may be inserted and a mechanism (22) for manual expulsion of the card with a button for actuation (80). In order to be able to handle two cards at a time and allow the operator to expel each of the two cards from the reading unit (10), by actuating a single button, a second housing, in which a second card may be inserted, is provided for next to the first housing and a second manual expulsion mechanism (52) for the second card may selectively be actuated by the same actuation button (80).

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**READING UNIT OF MAGNETIC MEMORY CARDS WITH MANUAL****CARD EXPULSION MECHANISM****FIELD OF THE INVENTION**

The present invention relates to a reading unit of magnetic memory cards comprising a first housing in which a card may be inserted and a manual expulsion device with an actuation button. The magnetic memory cards, commonly known as "IC memory cards" or "PCMCIA" memory cards, are used especially, but not solely, in portable computers, as additional storage memories or as alternatives to the memory storage areas on magnetic disk. These cards, of rigid type, are of standard dimensions 85 x 53 x 3 mm. and inside contain an integrated circuit (IC) and a high capacity memory. For connection of the integrated circuit and the memory on the card to the circuitry of the computer, each card is provided with a female connector with a series of holes suitable for mating with the corresponding cylindrical terminals of a male connector fitted on the reading unit.

**BACKGROUND OF THE INVENTION**

A magnetic memory card reading unit is known that includes a U-shape support, slightly larger than the card itself, in which a housing is provided, into which one card at a time may be inserted, and in which an expulsion mechanism is provided to disconnect the card from the male connector and push it towards the outside of the reading unit so that it may be extracted manually by the operator. The expulsion mechanism in turn includes an actuation button situated to the side of the housing for the card and designed for actuation by the operator.

**SUMMARY OF THE INVENTION**

The technical problem that the present invention proposes to solve is that of realizing a reading unit of magnetic memory cards that can simultaneously handle two cards

at a time, that is compact and in which the operator can select to expel each of the two cards by pressing the actuation button.

This technical problem is solved by the reading unit of magnetic memory cards according to this invention, which is characterised in that a second housing, designed for  
5 insertion of a second card, is provided for adjacent to the first housing and a second manual expulsion mechanism for the second card may be selectively actuated by pressing the same actuation button.

### BRIEF DESCRIPTION OF THE DRAWINGS

This and other characteristics of the present invention will appear clear from  
10 the following description of a preferred embodiment, provided by way of an example though by no means an exhaustive one, with the aid of the attached drawings, in which: Fig. 1 is a partial section, side view of a reading unit of magnetic memory cards according to the present invention, inserted in a portable computer, in the idle position;  
Fig. 2 is a front view of the reading unit of Fig. 1;  
15 Fig. 3 is a partial section, perspective view of the reading unit of Fig.1; and  
Fig. 4 is a partial section, perspective view of a reading unit of magnetic memory cards according to the present invention, in a first work position.

### DESCRIPTION OF A PREFERRED EMBODIMENT

With reference to Fig. 1, a reading unit 10 of magnetic memory cards according to the  
20 present invention, comprises two distinct reading groups 11 and 12, overlaid one on the other, each of which is suitable for reading a single magnetic memory card 13 (Fig. 3) of the "PCMCIA" or "IC memory card" type, already known and not described in detail herein.

The reading unit 10 is in turn suitable for insertion inside a portable computer 20 (Fig. 1 and 2) of known type, for example of the type described in the European Patent Application  
25 0 562 723, published on September 29, 1993 or in the European Patent Application 0 606 760, published on July 20, 1994, both in the name of the Applicant. The computer 20

is provided with a rectangular aperture 21 through which the magnetic memory cards 13 can be inserted into the reading unit 10.

The reading group 11, or reading group N° 1, is arranged under the reading group 12 and includes a U-shape support 15 in plastic material (Fig. 3) and of dimensions slightly larger than those of a card 13. The support 15 defines a first housing 16 (Figs. 2 and 3) in which a  
5 card 13 may be inserted and having two lateral guides 17 and 18 and a rear part 19.

The reading group 11 also includes a first mechanism 22 (Figs. 1 and 3) for expulsion of the card 13 inserted in the housing 16. The mechanism 22 in turn includes a bar, or first actuation element, 23 arranged externally to the support 15, parallel with the  
10 housing 16 and sliding in the longitudinal direction on transverse guides 24.

A rear end 25 of the bar 23 is connected to a lever 26 pivoting around a fixed pin 27 (Figs. 2 and 3) of the support 15 and having an upper tab 28 inserted in a central slot 29 in a metallic plate 32 housed in the rear part 19 of the support 15. The plate 32 has two side appendices 33 and 34 disposed in the guides 17 and 18 and two vertical tabs 35 and  
15 36 suitable for engagement with the inner edge of the card 13 to be expelled. The plate 32 is shaped so as to have two lateral slots 37 and 38 engaging, one with the fixed pin 27 and the other with a guide pin 41.

The reading group 12 (Figs. 1 and 2), or reading group N° 2, comprises a support 45 identical to the support 15 and overlaid on the latter. The support 45 defines a second  
20 housing 46 in which a card 13 may be inserted and having two lateral guideways 47 and 48 and a rear part 49. The housing 16 and 46 are thus arranged on two parallel planes.

The reading group 12 also includes a second mechanism 52 for expulsion of the card 13 inserted in housing 46. The mechanism 52 in turn includes a second bar, or second actuator element, 53 arranged externally to the support 45, parallel with bar 23 and sliding in  
25 the longitudinal direction on two guides 24 and two other transverse guides 54 parallel with guides 24.

A rear end 55 of the bar 53 is connected to a lever 56, identical to lever 26, pivoting around a fixed pin 57 (Figs. 2 and 3) in the support 45 and also having an upper tab inserted in a central slot (not shown on the drawings) in a metallic plate 62, identical to the plate

32, housed in the rear part 49 of the support 45. The plate 62 is provided with two vertical tabs 65 and 66 suitable for engagement with the inner edge of the card 13, inserted in a second housing 46.

According to a characteristic of the present invention, the reading unit 10 comprises  
5 a single actuation button 80 (Figs. 1 and 3) suitable for selective engagement, by way of an appendix 82 in said button, either with the bar 13 of the expulsion mechanism 22 or with the bar 53 of the expulsion mechanism 52. The button 80 is made of a plastic material and includes a central part 83, arranged next to and parallel with the bar 23 and guided on the bottom by two of the transverse guides 24, and an upper part 84, substantially parallel  
10 with the central part 83, arranged between one of the guides 24 and one of the guides 54. The button 80 also includes a front part 85, housed in an aperture 86 of the computer 20 in which the reading unit 10 is fitted, a stop tooth 87 and a seat 88 in which a helicoidal spring 89 is partly inserted. The latter is also partly housed inside a cylindrical cavity 91 of a block 92 of plastic material fitted between one of the guides 24 and one of the guides 54.  
15 Printed on the front part 85 of the button 80 are the numbers 1 and 2, respectively indicating reading group N° 1, the lower one, and reading group N° 2, the upper one, associated with the symbols of use to the operator in actuating button 80 and expelling the cards inserted in housings 16 and 46, as will be explained later in detail.

The reading unit 10 also includes a male connector 95 having two rows of metallic  
20 terminals 96 and 97, one arranged at the rear 19 of the reading group 11 and the other one at the rear 49 of the reading group 12, and each designed to mate with a corresponding female connector arranged on the inside of the card 13 to connect the integrated circuit and the memory housed inside the card with the circuitry of the computer 20.

Operation of the reading unit 10 described up to this point is as follows.

25 At rest, the actuation button 80 is in the position illustrated in Fig. 1 and in Fig. 3, pushed by the spring 89 towards the outside of the computer 20 and, due to the action of the component at right angles with the longitudinal axis of the button 80, also downwards (Fig. 1). The excursion of the button 80 is limited on the outside the the stop tooth 87 and at the bottom by the lower transverse guides 24. In this position the appendix 82 of button 80 is in

line with and ready to engage with the bar 23 of the expulsion mechanism 22 of the lower reading group 11.

Insertion of a card 13 in the reading unit 10 occurs in a way that is known through a rectangular aperture 21 provided in a wall of the computer 20. In particular, the user may insert a card 13 into the lower housing 16, if he wants the card to be read by the reading group N° 1, or into the upper housing 46, if he wants the card to be read by the reading group N° 2. It is clear that two cards 13 may be inserted simultaneously into the reading unit 10, one in housing 16 and the other in housing 46.

When a card 13 is inserted in the reading unit 10, for example in the lower reading group 11 (Fig. 3), the terminals 96 are inserted in the corresponding female connector of the card 13 (not shown on the drawings) and the internal circuit of the card and its magnetic memory are connected to the circuit part of the computer 20. In this position, the card 13, by pushing against the upper tabs 35 and 36, maintains the metallic plate 32 back and the bar 23 in the rest position, with the front edge close to the appendix 82 of the button 80.

The same applies for the tabs 65 and 66, the metallic plate 62 and the bar 53, of the expulsion mechanism 52, when a card 13 is inserted in the upper reading group 12. A card 13 may be expelled from a reading unit 10 simply by actuating the button 80 as follows. If a card 13 is inserted in the lower reading group N° 1, it may be expelled simply by pushing the button 80 towards the inside of aperture 86, by acting on the front part 85, until it comes into the working, or actuation, position, illustrated in Fig. 4, against the action of the spring 89. In this way, the appendix 82 pushes the bar 23 longitudinally inwards, causing the counter-clockwise rotation of the lever 26 which, by way of its upper tab 28, pushes in the forward direction the metallic plate 32 which, with its upper tabs 35 and 36, in turn pushes the card 13 towards the outside so that it may easily be extracted from the aperture 21 of the computer 20.

If instead a card 13 is inserted in the upper reading group N° 2, to expel it, the front part 85 of the button 80 must first be raised up by a few millimeters (2.7 in the particular embodiment described herein) and the button 80 then pushed towards the inside of the aperture 82 against the action of the spring 89. In this way, the appendix 82 pushes the bar

53 longitudinally towards the inside, causing the clockwise rotation of the lever 56 which results in a forward movement of the metallic plate 62 which, with its upper tabs 65 and 66, in turn pushes towards the outside the card 13 so that it may easily be extracted from the aperture 21 of the computer 20.

5           From the above description, it is clear that the reading unit 10 according to the present invention includes a first and a second housing 16 and 46 in each of which a card 13 may be inserted, a first and a second expulsion mechanism 22 and 52 for cards 13 and a single actuation button 80 which may selectively actuate both the first and the second mechanism 22 and 52 for expulsion of the cards 13.

10           It is obvious that changes or additions of parts may be made to the reading unit of magnetic memory cards described up to this point without exiting from the scope of the present invention.



## CLAIMS

1. A reading unit (10) of magnetic memory cards (13) comprising a first housing (16) in which a card (13) may be inserted and a manual mechanism (22) for expulsion of the card having an actuation button (80), characterised in that a second housing (46) in which a second card (13) may be inserted is provided adjacent to said first housing (16) and a second manual mechanism (52) for expulsion of said second card may be selectively actuated by said actuation button (80).
2. A reading unit of magnetic memory cards according to claim 1, characterised in that said actuation button (80) is movable between a rest position and two distinct working positions associated respectively with said first and said second expulsion mechanism (22, 52) and in that elastic means (89) constantly push said actuation button (80) towards said rest position.
3. A reading unit of magnetic memory cards according to claim 2, characterised in that said first expulsion mechanism (22) comprises a first actuation element (23) arranged adjacent to said first housing (16), that said second expulsion mechanism (52) includes a second actuation element (53) arranged adjacent to said second housing (46), and that said actuation button (80) may selectively engage said first or said second actuation element (23, 53).
4. A reading unit of magnetic memory cards according to claim 3, characterised in that said elastic means (89) comprise a single spring compressed between a fixed part (91) of said reading unit and said actuation button (80) to keep the latter set to engage said first actuation element (23).
5. A reading unit of magnetic memory cards according to claim 4, characterised in that said spring (89) is of the helicoidal type and has one part that is inclined with respect to said actuation button (80) in order to provide the latter with two thrust components at right angles to each other.

6. A reading unit of magnetic memory cards according to claim 3, characterised in that said first and said second housing (16, 46) are arranged one on top of the other on parallel planes, that said first and second actuation element (23, 53) and said actuation button (80) are parallel with these planes, and that said actuation button (80), to actuate said first actuation element (23) moves between said rest position and a first of said working positions in a direction that is parallel to said planes.

7. A reading unit of magnetic memory cards according to claim 6, characterised in that said actuation button (80), to actuate said second actuation element (53), is inclined with respect to said parallel direction, against the action of said elastic means (89).

8. A reading unit of magnetic memory cards according to any one of the claims 3 to 7, characterised in that said first actuation element (23) comprises a first bar sliding longitudinally between a rest position and an actuation position, that said second actuation element (53) comprises a second bar parallel with said first bar and sliding longitudinally between a rest position and an actuation position, and that said actuation button (80) comprises a single appendix (82) selectively engageable with said first and said second bar (23, 53) to bring either of these from said rest position to said actuation position.

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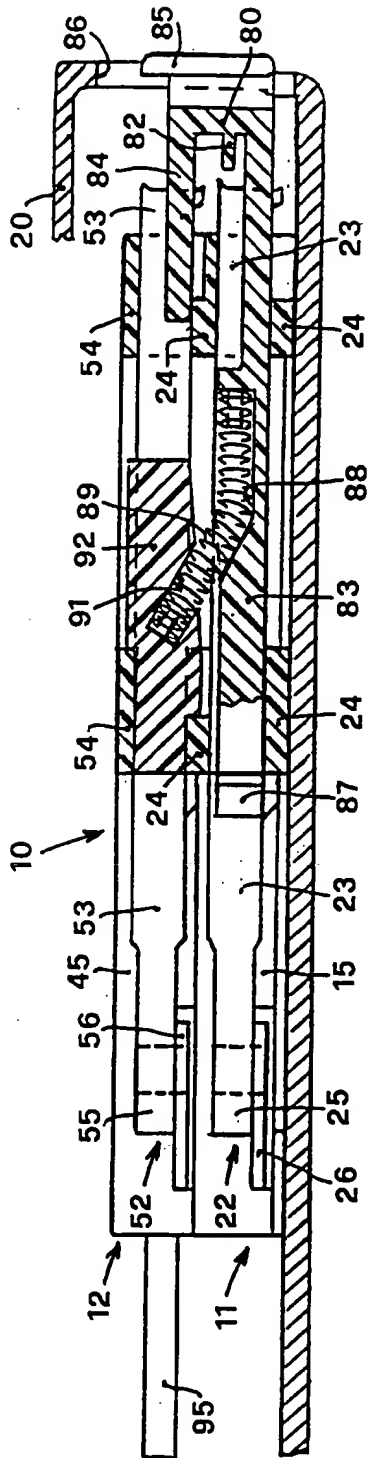


Fig. 1

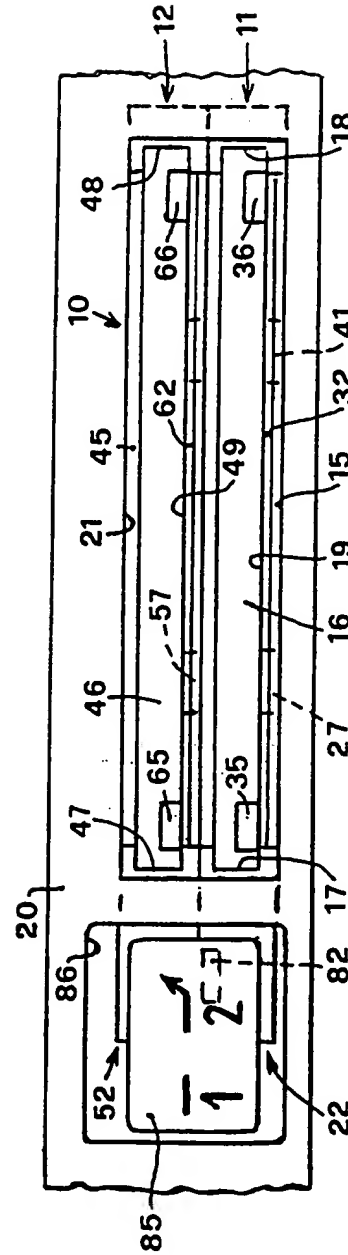


Fig. 2

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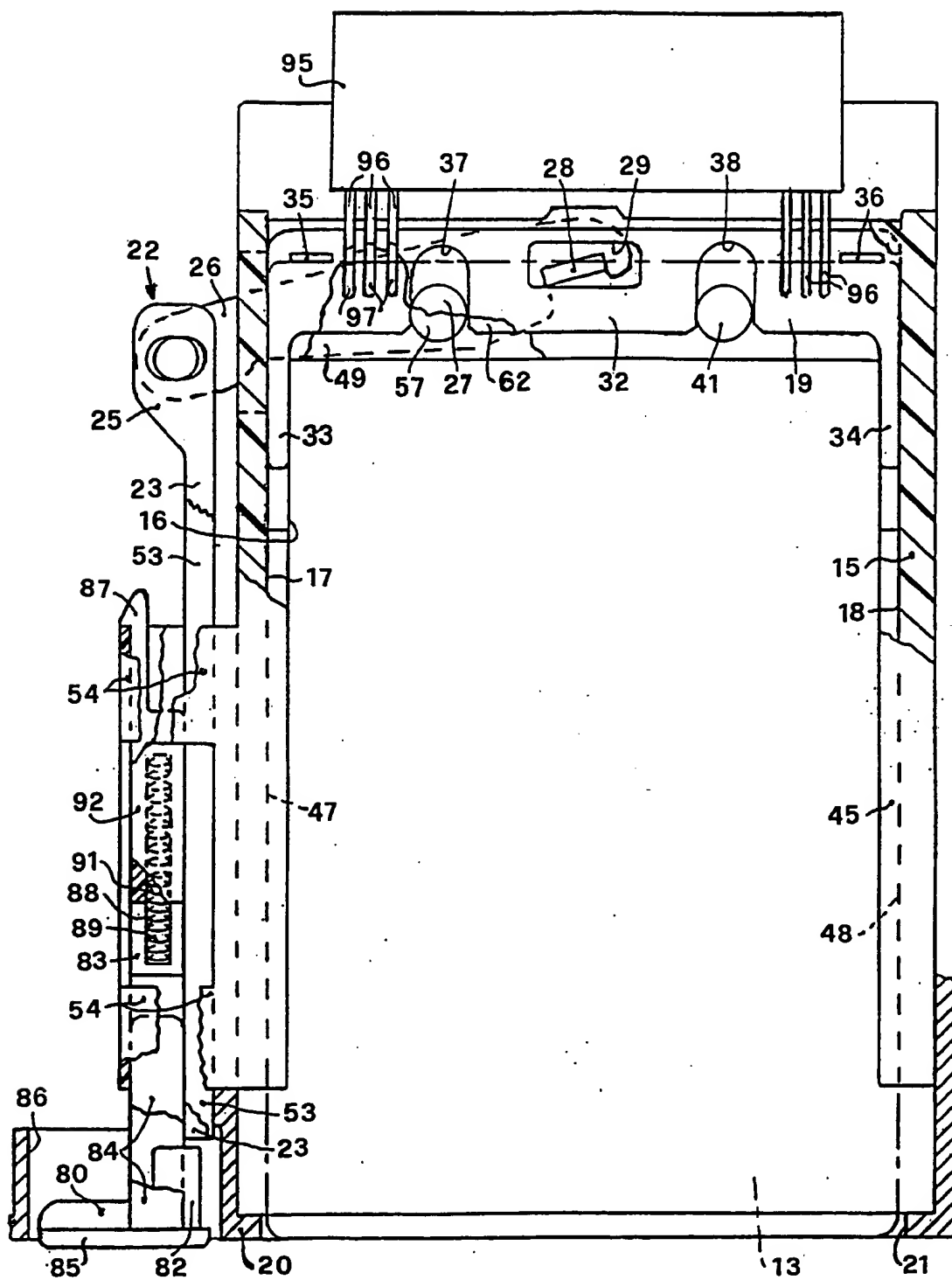


Fig. 3

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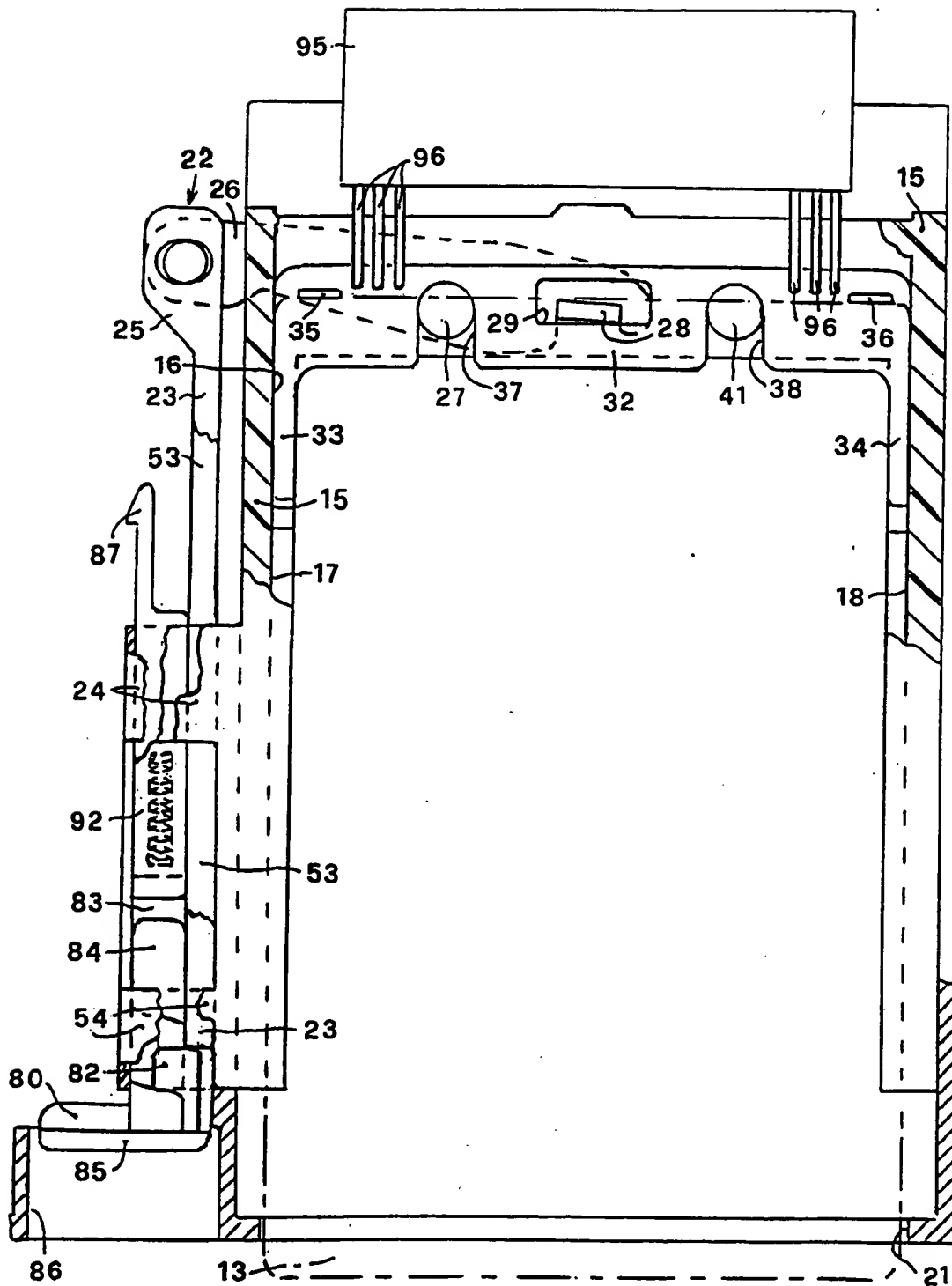


Fig. 4

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IT 95/00061

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 G06K13/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 438 914 (SHARP KABUSHIKI KAISHA) 31 July 1991 see abstract; figures 1,2 ---	1-3
A	IBM TECHNICAL DISCLOSURE BULLETIN, vol.35, no.3, August 1992 page 139, XP000326208 'compact split ejector button for double desk ic card holder' -----	6,8

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

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Date of the actual completion of the international search

1 August 1995

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IT 95/00061

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0438914	31-07-91	US-A- 5115376	19-05-92
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